Poverty Scoring: A Comparison between Set of Government Poverty Indicators and the Use of Nutritional Status Indicators of Children Under-five Years of Age for Poverty Targeting in East Flores and Sikka District, East Nusa Tenggara Province, Indonesia

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Abstract

The objective of the paper is to compare the effectiveness of poverty scoring using the government set of poverty indicators and nutritional status indicators for the purpose of poverty targeting at district or village level. Poverty scoring using non-monetary indicators is an alternative for poverty targeting. Different sets of indicators were applied in order to find out which of the sets would be more precise in targeting the poor. Eventhough significant differences were not found, applying poverty scoring with nutritional indicator would not just reflect the severity of the poverty, but also include the outcome of poverty.

Keywords: poverty scoring, stunting, underweight

Introduction

Poverty targeting at village level has been quite a problem in Indonesia. True, that until provincial level, the poverty targeting can be based on the result of the official poverty line calculated by Central Bureau of Statistics (CBS). However, the implementation of the official poverty line for the purpose of poverty targeting at the lower level is difficult to apply. The main reason is due to under representative of sampling size at the district and village level, which makes the results of the official poverty line can not be implemented to distinguished which village is poorer than others. (CBS, 1998).

Since economic crisis strikes, there has been many poverty alleviation activities targeting the poor. Until present moment, official targeting criteria often misclassify the poor and the non-poor (Suryahadi et al., 1999). The need of a screening tool has driven CBS to developed a new system that functions to increase the precision of poverty targeting at the village level. Unfortunately, it did not include any nutritional indicator.

Nutritional indicators, in this case anthropometric indices of vulnerable age groups, can be a used as indicator for poverty in communities and populations. The reasons applying nutritional indicators of children underfive were, first, it is generally accepted that children underfive is the most vulnerable age group to poverty compared to the rest of population. Secondly, it has been consistently observed in numerous studies that anthropometric indicators of growing children with inadequate dietary intake who are repeatedly ill do not affect the attainment of their genetic potential (Gross, 1997). Thus, the objective of the paper is to compare the effectiveness of poverty scoring using the government set of poverty indicators and nutritional status indicators for the purpose of poverty targeting at district or village level.

Subject and Methodology

Subject. The study was carried out in East Flores and Sikka Districts, East Nusa Tenggara province of Indonesia. The villages were selected randomly within the framework of under developed villages' program. The target population is household with children underfive. Minimum randomly selection of 30 households from each village with total of 439 households with 593 children underfive from East Flores (11 villages) and Sikka (6 villages) were surveyed.

Methodologies. Household data were collected using a pre-tested open-ended questionnaire. Sixteen trained enumerators were involved in the survey with two supervisors. The height of mother and children older than two years of age were measured standing using microtoise (height measuring tape). Children under two years of age were measured using

baby board. The weight of the mother and children were measured using a Unicef SECA digital weighing scale with errors up to 0.0 kg. All measurements applied standardized method.

Derivation of anthropometric indices, depicted by height-for-age (haz), weight-for-age (waz) and weight-for-height (whz) z scores, were calculated using the Epi Info software package, using NCHS population of healthy children underfive as reference population. Children having Z-scores less than -2.00 are considered to be undernourished. Adult women's body mass index (kg/m^2) was calculated using a SPSS statistical program with cut off points of below 18 classified as undernourished.

Statistical Analysis. Statistical test of Kolmogorov-Smirnov was conducted to analyze the normality of data. Data are reported as mean and standard deviation (SD). Difference between means of normally distributed data was tested using Anova and unpaired t-test. Categorical parameters were analyzed using Chi-square (Hassard, 1991).

Poverty scoring was calculated using the system developed by CBS (1998) which differentiate criteria for urban and rural. The complete set of indicators can be seen in Table 1. Since the villages surveyed were located in rural area, it was the combination of indicators suited for the rural area that was applied. The total sum of all score will determine whether a household is poor or not. Poverty Scoring A consists of variables 1 - 8 with scores less than 15 classified as poor. Poverty Scoring B consists of variables 1 - 10 with scores less than 17 regarded as poor.

Table 1. Classification and Scoring of Indicators of Poverty of CBS for Rural Area

No	Variable	Classification	Scoring
1.	Number of household member	1. 1	3
		2. 2-3	2
		3. > 3	1
2.	Education of father or	1. ≥ high school	3
	head of household	2. junior high	2
		3. ≤ elementary school	1
3.	Occupation of father or	1. industry	3
	head of household	2. trade, service, etc.	2
		3. agriculture production	1
4.	Materials of Wall	1. Cemented	3
		2. wood	2
		3. bamboo/others	1
5.	Type of energy for cooking	1. gas	3
		2. oil	2
		3. woods	1
6.	Sources of Light	1. electricity	2
		2. no electricity	1
7.	Sources of Water	1. Piped water	3
		2. well	2
		3. river, waterspring etc.	1
8.	Ownership of things	1. ≥ 2	3
	(tv, meubel, etc.)	2. 1	2
		3. do not own anything	1
9.	Stunting	1. Normal	2
		2. Stunting	1
10.	Underweight	1. Normal	2
		2. Stunting	1

Hh = head of the households

Results

Table 2 presents general characteristics of the surveyed area. In general, Sikka district is less developed compared to East Flores. It can be seen from indicators such as significantly higher illiterate father and mother (those having formal education less than 3 years), fewer wells, significantly fewer households supplied with electricity and fewer latrines. Furthermore, the housing materials of East Flores are slightly better than Sikka. A proxy indicator for income such as ownership of goods (tv) indicated a significantly higher percentage in East Flores compared to Sikka. The majority of households depends in its income on farming resources.

Table 2. General characteristics of Surveyed Districts

Indicators	East Flores (n=294)	Sikka (n=149)	Total (n=439)
Average number of household size (mean±SD)	6.13±1.9	6.41±2.1	6.23±1.9
Education of father [1] (%):			
1. less than 3 years	6.5	33.8	15.5
2. 3 years and more	93.5	66.2	84.5
Education of mother [1] (%):			
1. less than 3 years	3.7	36.6	14.6
2. 3 years and more	96.3	63.4	85.4
Occupation of father (%):			
1. no occupation	3.4	1.4	2.7
2. farmer, fishermen	82.7	85.5	83.6
3. other (trader, government staff, monthly wage worker, etc.)	13.9	28.2	13.7
Occupation of mother [1] (%):			
1. no occupation	48.3	18.6	38.5
2. occupation (farmer, trader)	51.7	81.4	61.5
Landownership (%):	91.5 (n=282)	90.7 (n=140)	91.2 (n=422)
conduct agriculture production (%)	91.4 (n=258)	90.7 (n=127)	91.2 (n=385)
Ownership of goods (%)			
1. motorcycle	2.4	0.7	1.8
2. tv [1]	7.8	0	5.2
3. radio	30.3	27.6	29.4
Material of roof (%):			
1. tin	69.7	59.3	59.7
2. leaves	28.9	39.3	39.0
Material of wall (%):			
1. bamboo	46.9	84.8	59.5
2. cement	15.0	8.3	12.8
Material of floor (%):			
1. mud/soil	64.6	77.9	69.0
2. cement	33.7	14.5	27.3
Electricity [1] (%)	39.1	3.4	27.3
Children <5 meal per day:			
1. once	3.4	6.9	4.6
2. twice	15.0	16.6	15.5
3. 3 times and more	71.1	60.0	67.5
Type of energy for cooking (%):			
1. wood	95.6	98.6	96.6
2. kerosene	2.0	1.4	1.8
3. both	2.4	0	1.6
Latrine (%)	66.0	32.4	54.9
Source of drinking water (%):			
1. river	11.6	48.3	23.7
2. well/spring	80.6	44.8	68.8
3. others (rain water, etc.)	7.8	8.9	7.5

[1] Chi Square, significant difference $p < 0.01$

Table 3. Nutritional Status of Mothers and Children Underfive

Indicators	East Flores (n=404)	Sikka (n=189)	Total (n=593)
Age of children underfive in months (mean±SD)	26.8±17.2	27.1±16.8	26.9±17.0
Gender (%):			
1. Boy	50.2	50.8	50.4
2. Girl	49.8	15.7	49.6
haz (mean±SD)	-1.82±1.1	-1.92±1.2	-1.85±1.1
waz (mean±SD)	-1.84±0.9	-1.91±1.1	-1.86±1.0
whz (mean±SD)	-0.95±0.95	-0.98±0.94	-0.96±1.0
stunting* (%)	47.8	53.4	49.6
underweight[1*] (%)	47.0	56.6	50.1
wasting* (%)	10.1	10.6	10.3
BMI of mothers (mean±SD)**	20.1±2.9	19.8±2.2	19.9±2.7
BMI of mothers (%)**:			
1. Low (BMI<18)	32.3	29.9	31.5
2. Normal (BMI≥18)	67.7	70.1	68.5

[1] Chi Square significant difference $p < 0.05$

* values of haz, waz and whz less than -2.00 SD of reference population

** Excluding repeated values of second child and pregnant mothers, n=414

Table 3 indicated the nutritional status of mothers and children underfive. Looking at the mean of z-scores of anthropometric indices, nutrition status of children in East Flores is slightly better than Sikka. However, the results indicated that in both districts 50 percent of children underfive are under-nourished measured by stunting and underweight. Furthermore, stunting and underweight represent outcome of chronic malnutrition. The nutritional status of the mothers showed a different tendency. Stating that on average the BMI of mothers in Sikka are worse off, but on the contrary, higher percentage of normal BMI mothers were found in Sikka. Indicating the low BMI mothers of Sikka are worse of compared to low BMI mothers of East Flores.

Table 4 pointed out the results of both poverty scoring and therefore, should be interpreted carefully. The additional district's columns indicated the comparison between the two scoring method in estimating poverty in both of the districts. Thus, the total column does not represent the numbers inside the district's column. Poverty scoring A produced a slightly higher number of poor households compared to poverty scoring B, eventhough it was not significant. However, significant difference was found only in the percentage of poor

households between East Flores and Sikka using the poverty scoring B. The scoring system categorized almost all households as poor.

Table 4. Cross Tabulation of Poverty Scoring

Poverty Scoring A		Poverty Scoring B (incl. nutrition indicators)		District		Total
		poor	non poor	East Flores (%)	Sikka (%)	
poor	number	403	23			426
	% of Poverty Scoring A	94.6	5.4	95.9	99.3	100
	% of Poverty Scoring B	100.0	63.9	89.9*	95.9*	97.0
	% total	91.8	5.2			97.0
non poor	number		13			13
	% of Poverty Scoring A		100.0	4.1	0.7	100.0
	% of Poverty Scoring B		36.1	10.2*	4.1*	3.0
	% total		3.0			3.0
Total	number	403	36	294	145	439
	% of Poverty Scoring A	91.8	8.2			100.0
	% of Poverty Scoring B	100.0	100.0			100.0
	% total	91.8	8.2			100.0

* Chi Square significant difference at $p < 0.05$

Discussion

The poverty scoring method created by CBS is not new. Other studies have been doing the same thing, combining not just only non-monetary indicators, but also try to combine both monetary and non-monetary indicators. The application of non-monetary indicators for poverty targeting has not been in favor due to reason that non-monetary indicators do not reflect the current income (Sevenhuysen, 1999). Other arguments against the use of nutritional indicators are stating that nutritional status is too dependent on other factors and the errors in measurement method (Shrinivasan, 2000; Ravallion, 1992). However, it should also be kept in mind, that the concept of poverty is growing and encompassing not just only monetary indicators but also non-monetary such as health, education, nutrition, food security, even to human rights (World Bank, 1990; Frankenberger, 1996).

The poverty scoring method serves as a useful tool for targeting. Although the areas in this study were considered already as under-

developed, it was shown that the poverty scoring was able to target a poorer area. However, there are few points that should be carefully discussed. First, the choice of non-monetary indicators should be further analyzed. In this study it can not distinguished poor villages and the non-poor villages or even difference between urban and rural, since the subject area covers only less developed villages and rural area. Second, the cut off points that was set arbitrary to differentiate the scoring. This is the most crucial step in developing the poverty scoring. Yet, in some indicators such as type of occupation of father does not include non-working option. Another example is the education of father. A person who only experiences 3 years of formal education is considered to be illiterate. This option was combined to education less than 6 years. Illiteracy has been a factor that differentiate higher wage loan, especially in urban area and are prevalent in poorer households. Thus, the categorization of each indicator should be investigate more carefully in order to distinguish more precisely the poor and non-poor. As for the application of nutritional status indicators were not determined arbitrary, but through comparison with a reference population.

From the point of nutritional status of children underfive, both of the districts were considered to have a serious problem. Possible direct determinants as proven by other studies were due to inadequate food intake, frequent exposure to illness and low caring capacity of mothers or caretakers (Smith and Haddad, 2000; Engle et al., 1999). By considering only the anthropometric status, it can be concluded that both areas classified as poor, considering the pathway that shows nutritional status as outcome of poverty.

The differences between the results of poverty scoring methods can be explained by the distribution of stunting and underweight in each of the districts. Both poverty scoring methods classify more than 96 % of stunted children belong to poor households. In addition, both methods classify more than 97% of underweight children to poor households. Furthermore, the cross tabulation between poverty scoring and

anthropometric indices would produce a better targeting. The percentages of stunted children under five from poor households (calculated with Poverty Scoring B) are 45.5 % and 53.4 % for East Flores and Sikka, respectively. These numbers represent the worst or most severe poor household condition compared to other categories, since they are not just only poor, but also suffering from longer or chronic malnutrition possible from food insecurity and lack of other resources.

Conclusion

The results of this research need to be more tested using larger sets of households data in order to see the effectiveness differentiating the poor and non poor districts or villages. However, for the purpose of targeting, combining non-monetary indicators with nutritional indicators has proven to be useful and it comprises also the severity of poverty status. In addition, this method has the advantage of easy to develop and interpret.

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